Comments on the EU *ad hoc* Group's "Assessment for OIE Listing of Koi Herpesvirus Disease (KHVD)" by the *ad hoc* Advisory Group (Finfish Subgroup) to the OIE Fish Disease Commission

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Summary

The Finfish Subgroup wishes to thank the individuals of the *ad hoc* EU Group who have carefully compiled the "Assessment for OIE Listing of Koi herpesvirus disease (KHVD)". In general, the Finfish Subgroup agrees that many of the criteria needed for listing of a disease by OIE are met. However, in addition to the criteria presented to the subgroup, there are several other features of the disease (KHVD) and the agent (KHV) that we believe require consideration or further clarification prior to a recommendation for listing by OIE.

Perhaps paramount among the considerations is that KHVD would be the first OIE-listed disease that is primarily a disease of ornamental fish. Thus, a complex and currently unregulated or poorly regulated network of pathways for fish (and pathogen) movements would have to be addressed. It is unclear whether there would be the mechanisms or the willingness in many OIE Member Countries to create the necessary framework for the required surveillance for issuance of health certificates for international trade in ornamental carp.

Secondly, although it is certain that farmed (pond or cage cultured) populations of common carp have been seriously affected by KHVD, evidence for negative impacts on wild populations is only just emerging. The most recent events in Japan are suggestive that such impacts can occur but the principal host involved in the large majority of disease outbreaks however is, and will most likely continue to be, koi (ornamental, fancy, coloured, etc. carp).

Lastly, features of the biology of KHVD and KHV remain unresolved and could severely complicate programmes aimed at control and containment of the disease, and surveillance programmes to demonstrate freedom. Examples of these features include the current uncertainty about the establishment of "carriers" and whether fish with anti-KHV antibodies or KHV DNA detected by PCR can indeed transmit the virus. Also, vaccination is likely to be a key focus for potential control, particularly in the principal regions from which most koi are exported. Vaccination is apt to render one of the more important tools for detecting prior virus exposure (potential carriers?) that being the presence of serum anti-KHV antibodies.

The Finfish Subgroup is of the view that certain considerations for listing of KHVD are similar to those of currently OIE-listed diseases but others are clearly different and this makes it important to consult further prior to reaching a conclusion on the EU proposal for listing of KHVD. The Subgroup proposes further deliberations among experts and consideration of comments from more OIE Member Countries on the justification for and the consequences/impacts and practicality of listing KHVD, before a recommendation

is made.

Particular Comments from the Finfish Subgroup on the "Assessment/proposal"

In the following section the Subgroup comments on particulars in the proposal by the group of EU experts that prepared the "Assessment for OIE Listing of KHVD" and in particular the section of that assessment marked "Evaluation of Koi Herpesvirus (KHV) Disease and Proposal for Future Listing by the OIE" (from hereon referred to as the "Assessment").

A. Consequences

1. Significant production losses at a national or multinational level

Large-scale production losses of farmed koi and/or common carp have been reported from Israel, Japan, Germany, Indonesia and Poland and these are well documented in the Assessment, prior literature, and a recent review of KHV by Haenen *et al.* (2004). Significant losses among smaller scale koi producers, wholesalers, and retailers have also occurred in numerous countries worldwide and the economic costs of that mortality likely exceeds that at the production scale level. Proper evaluations of the losses due to KHVD are easily complicated by other factors as concurrent infections (e.g. *F. columnare* or a range of ectoparasites) are often observed in fish from which KHV is identified. The events in Indonesia provide a noteworthy example. Despite serious losses among cultured common carp populations in 2002, outbreaks were rare in 2004 and conclusions from a FAO sponsored investigation of the 2002 losses suggest that factors other than KHV may have been involved in the large-scale losses observed in 2002.

The Subgroup does agree that preventing the spread of KHV to cultured populations of common carp in major production areas of Central and Eastern Europe and Asia is important. We suggest that at a minimum, regional or national programmes aimed at this goal be established.

2. Affects wild fish populations

The most recent and compelling example that wild populations of common carp may be affected by KHVD comes from Japan in 2003. Significant losses among wild common carp were reported from Lake Biwa in the spring of 2003 with estimates of losses as high as 70% of the wild stock in the lake. Further studies on the longer-term impacts of KHV on these wild carp stocks are underway.

In other locations, the role of KHV in mortality among wild carp populations are under evaluation (e.g. in the United Kingdom [UK] and the United States of America [USA]) and the information collected should provide insights into the potential for the virus to cause negative population impacts. It should be indicated that the carp sport fishery in the UK, which involves catch and release approaches in somewhat confined environments, may not represent the impacts on more naturally occurring common carp populations. It has recently been reported by Dr. John Grizzle, Auburn University, Alabama (personal communication) that KHV is present in wild common carp populations in the Southeastern USA. KHV specific DNA sequences were detected by PCR and confirmed by sequencing in the absence of large-scale fish losses or clinical signs of KHVD.

Based upon the fragmentary data collected to date, the Finfish Subgroup agrees that KHVD does pose some risk to wild common carp populations. However, additional data that includes a more rigorous epidemiologic approach to outbreak investigation is needed to confirm the association between virus infections and population impacts. This is critical because KHV infections alone may not always be the sole cause of mortality observed (e.g. many cases in Indonesia). Also, the longer-term impacts of the virus on wild carp populations are uncertain. Recent data from Japan on the apparent acquisition

of a "herd-like" immunity has been proposed as one potential reason for the absence of continuing mortality among wild common carp in areas where outbreaks had been reported in the prior year (Miwa S., personal communication). Lending further evidence to support this hypothesis was the presence of anti-KHV antibodies detected in the sera of samples taken from these wild common carp.

3. Public health concern

No comments.

4. Infectious aetiology proven

No comments.

5. Infectious agent associated but aetiology not proven

No comments.

6. Potential for international spread via live animals and their products

The Subgroup agrees that the extensive and often unregulated movements of koi, through the international ornamental fish trade (and even by individual hobbyists), provides a major network for spread of KHV. The experience in Japan also demonstrated the dangers associated with large scale national movements from central common carp rearing facilities in the rapid and comprehensive spread of KHV in 2003 (Sano *et al.*, 2004).

7. Several countries/zones may be declared free

Until a more comprehensive surveillance programme is developed, and certain countries may be unwilling to initiate such exercises, most information on the geographic distribution of KHVD will come from outbreak reports. It is clear that the virus is now widely spread and perhaps continuing to spread as a result of the trade in live koi. The known geographic distribution of KHV is apt to significantly expand as ornamental fish hobbyists become more aware about the disease and as more countries develop laboratory capabilities to detect the virus or evidence of the virus by PCR or ELISA.

8. A repeatable and robust means of detection/diagnosis exists

The current approach to detection and diagnosis are mentioned in the Assessment. Isolation of virus has proven to be difficult and several different PCR tests are in use, some with more and others with less field-testing or validation. Serological approaches, in particular ELISA detection of serum anti-KHV antibodies, do appear to be a good indicator of prior exposure to the virus. Both field and laboratory studies on the ability of these diagnostic methods to detect not only acute but latent or inapparent infections with the virus are underway. Generally accepted at this time is that PCR positive tests can be used to confirm acute infections when the appropriate signs and environmental conditions are present among koi or common carp undergoing losses. A positive test by ELISA from koi or common carp following natural exposures to the virus is viewed as an indicator of the "potential" for in apparent or latent infections or at a minimum, an increased risk for disease transmission.

REFERENCES IN ADDITION TO THOSE PROVIDED IN THE ASSESSMENT

SANO M., ITO T., KURITA J., YANAI T., WATANABE N., MIWA S. & IIDA T. (2004). First detection of koi herpesvirus in cultured common carp *Cyprinus carpio* in Japan. *Fish Pathology*, **39** (3), 165–168.

Reantaso, M et al. (2004). An Emergency Disease Control Task Force on a Serious Disease of Koi and Common Carps in Indonesia (subsequently referred to as 'Task Force' in this document), organized by

NACA in cooperation with ACIAR and AAHRI.

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The entire volume of papers currently “in press” from the March 2004 international meeting on KHVD in Yokohama, Japan. These should be available in March 2005 – Contact Dr. Shigeo Hayashe, NRI, Japan (xhayase@fra.affrc.go.jp).